

CE

**INSTALLATION and
OPERATING INSTRUCTIONS**

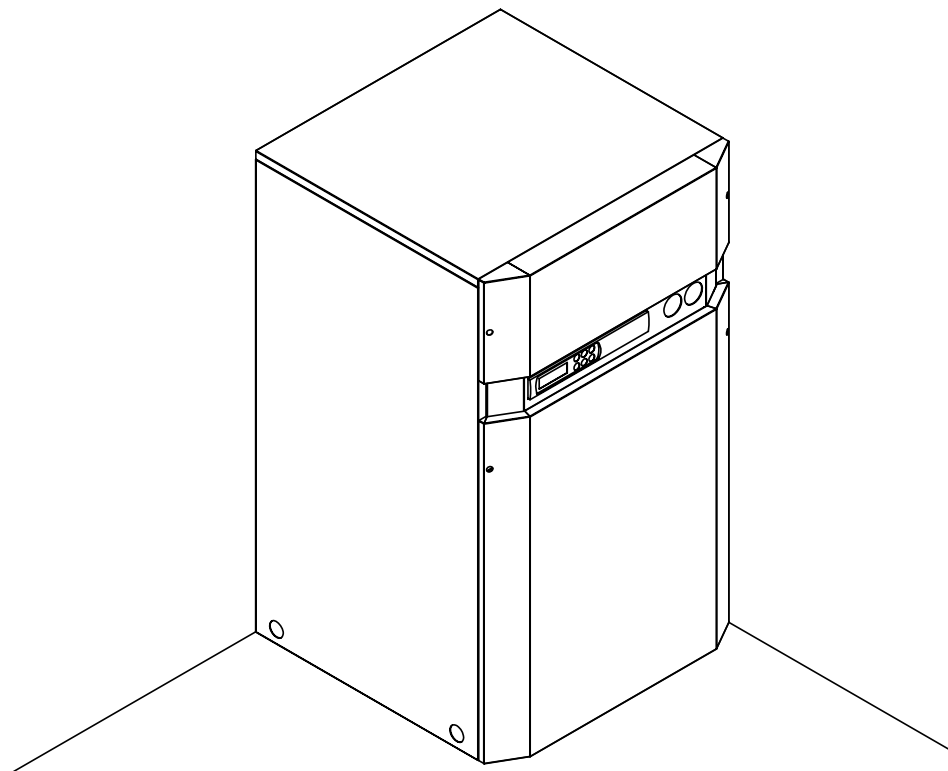
**Brine-to-Water Heat Pump
for Indoor Installation**

SI 7KS

SI 9KS

SI 11KS

SI 14KS



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1 READ IMMEDIATELY

1.1 Important Information

CAUTION! The heat pump is not secured to the wooden pallet.

CAUTION! The heat pump must not be tilted more than max. 45° (in either direction).

CAUTION! Do not lift unit by the holes in the panel assemblies!

CAUTION! In the case of large-capacity heating circuits, the installed expansion vessel (24 litres, 1.0 bar admission pressure) must be supplemented by an additional vessel.

CAUTION! The brine solution must contain at least 25 % of an antifreeze and corrosion protection agent on a monoethylene glycol or propylene glycol basis.

CAUTION! On connecting the electrical load lines, the clockwise phase sequence must be observed (in the case of an incorrect phase sequence the heat pump will deliver no output and generate a lot of noise).

CAUTION! Commissioning of the heat pump must be performed in accordance with the installation and operating manual of the heat pump controller.

CAUTION! **Caution - Heating Contractors !** Depending on the filling water quality and quantity, in particular in the case of mixed installations and plastic pipes, mineral deposits (rust sludge, lime) may form, impairing the proper functioning of the heating installation. A reason for this is the water hardness and oxygen dissolved in the filling water as well as additional oxygen from the air, which may penetrate via valves, fittings and plastic pipes (oxygen diffusion). As a preventive measure it is recommended that a physical water conditioner such as ELYSATOR be used.

CAUTION! The supplied strainer is to be fitted in the heat source inlet of the heat pump in order to protect the evaporator against contamination.

CAUTION! Any work on the heat pump may only be performed by authorised and qualified customer service agents.

1.2 Legal Provisions and Directives

This heat pump conforms to all relevant DIN/VDE regulations and EU directives. For details refer to the EC Declaration of Conformity in the appendix.

The electrical connection of the heat pump must be performed according to and conforming with all relevant VDE, EN and IEC standards. Beyond that, the connection requirements of the local utility companies have to be observed.

The heat pump is to be connected to the heat source and heat distribution systems in accordance with all applicable provisions.

1.3 Energy-Efficient Use of the Heat Pump

By operating this heat pump you contribute to the protection of our environment. A prerequisite for an efficient operation is the proper design and sizing of the heating system and the heat source system. In particular, it is important to keep water flow temperatures as low as possible. All energy consumers connected should therefore be suitable for low flow temperatures. A 1 K higher heating water temperature corresponds to an increase in power consumption of approx. 2.5 %. Underfloor heating systems with flow temperatures between 30 °C and 40 °C are optimally suited for energy-efficient operation.

2 PURPOSE OF THE HEAT PUMP

2.1 Application

The brine-to-water heat pump is designed for use in existing or newly built heating systems. Brine is used as the heat carrier in the heat source system. Ground coils, ground collectors or similar systems can be used as the heat source.

2.2 Principle of Operation

The heat generated by the sun, wind and rain is stored in the ground. This heat stored in the ground is collected at low temperature by the brine circulating in the ground collector, ground coil or similar device. A circulating pump then conveys the warmed brine to the evaporator of the heat pump. There, the heat is given off to the refrigerant in the refrigeration cycle. When so doing, the brine cools so that it can again take up heat energy in the brine circuit.

The refrigerant, however, is drawn in by the electrically driven compressor, is compressed and "pumped" to a higher temperature level. The electrical power needed to run the compressor is not lost in this process, but most of the generated heat is transferred to the refrigerant as well.

Subsequently, the refrigerant is passed through the condenser where it transfers its heat energy to the heating water. Based on the thermostat setting, the heating water is thus heated to up to 55 °C.

3 BASELINE UNIT

The baseline unit consists of a heat pump of compact design, ready for connection. In addition to the control panel with integrated controller, the unit also contains essential components of the heating and brine circuits:

- expansion vessels
- circulating pumps
- pressure relief valves
- pressure gauges
- overflow valve (heating circuit)

The refrigeration cycle contains the refrigerant R407C. Refrigerant R407C is CFC-free, non-ozone depleting and non-combustible.

All components required for the operation of the heat pump are provided on the control panel. The power feed for load and control current must be field-installed by the customer.

The collector loops including brine manifold must be provided by the customer.

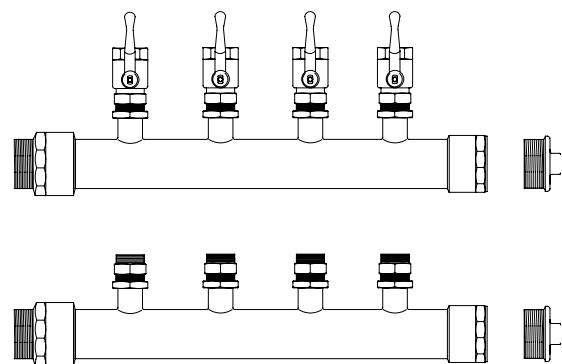


- | | |
|----------------------|---------------------|
| 1) Control panel | 4) Compressor |
| 2) Circulating pumps | 5) Evaporator |
| 3) Condenser | 6) Expansion vessel |

4 ACCESSORIES

4.1 Brine Manifold

The brine manifold ties the individual collector loops of the heat source system into a single main line which is connected to the heat pump. Integrated ball valves allow individual brine circuits to be shut off for venting purposes.



4.2 Brine Pressostat

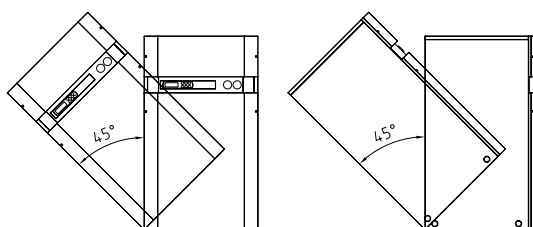
Where this is a legal requirement, a low-pressure brine pressostat may be installed in the unit. In this case, the connection provided above the brine expansion vessel should be used.

5 TRANSPORT

A lift truck is suited for transporting the unit on a level surface. If the heat pump needs to be transported on an uneven surface or carried up or down stairs, carrying straps may be used for this type of transport. These straps may be passed directly underneath the wooden pallet.

CAUTION!

The heat pump is not secured to the wooden pallet.



CAUTION!

The heat pump must not be tilted more than max. 45° (in either direction).

For lifting the unit without pallet, the holes provided in the sides of the frame should be used. The side panel assemblies must be removed for this purpose. A commercially available pipe can be used as a carrying aid.

CAUTION!

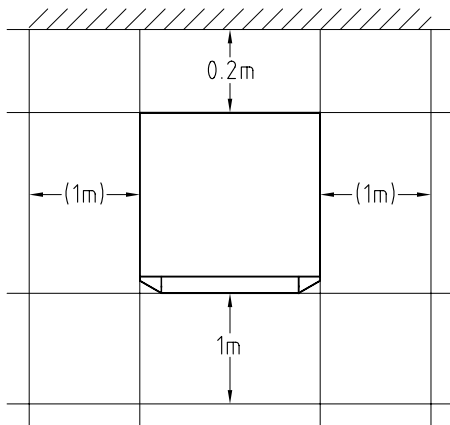
Do not use the holes in the panel assemblies for lifting the unit!

6 INSTALLATION

6.1 General Information

As a rule, the unit must be installed indoors on a level, smooth and horizontal surface. The entire base frame should thereby make close contact with the surface in order to ensure adequate sound insulation. Failing this, additional sound insulation measures may become necessary.

The heat pump should be located to allow safe and easy maintenance/service access. This is ensured if a clearance of approx. 1 m in front of and to each side of the heat pump is maintained.



6.2 Sound Emissions

The heat pump offers silent operation due to efficient sound insulation. Noise transmission to the foundation or the heating system is largely prevented by internal decoupling measures.

7 MOUNTING

7.1 General

The following connections need to be established on the heat pump:

- supply/return flow of the brine system
- supply/return flow of the space heating and water heating system
- common return of space heating and water heating system
- return, overflow valve
- connection for additional expansion vessel (as required)
- drain lines of overflow valves
- condensate drain
- power supply

7.2 Heating-Side Connection

The heat pump features separate outlets for the space heating and water heating circuit.

In cases where the heat pump has no water heating mode, the hot water outlet has to be permanently sealed.

Prior to establishing the heat pump connections on the heating water side, the heating installation must be flushed in order to remove any impurities that may be present, as well as residues of sealing material, or the like. Any accumulation of deposits in the condenser may result in a total failure of the heat pump.

In systems equipped with heating water flow shut-off devices such as radiator or thermostat valves, an overflow valve is installed. This assures a minimum heating water flow through the heat pump and prevents any malfunctions for occurring.

Once the installation on the heating side has been completed, the heating system must be filled, deaerated and pressure-tested.

Frost Protection for Installations Prone to Frost

Provided the controller and the heating circulating pumps are ready for operation, the frost protection function of the controller is always activated. If the heat pump is taken out of service or in the event of a power failure, the system must be drained. In heat

pump installations where a power failure cannot readily be detected (e.g. holiday houses), the heating circuit must contain a suitable antifreeze product.

The integrated expansion vessel has a capacity of 24 litres. This capacity is appropriate for buildings with a heated living space floor area of up to 200 m².

The planner of the heating system should verify that the capacity of the expansion vessel is adequate. An additional expansion vessel may have to be installed, if required (as per DIN 4751 Part 1). Charts in manufacturer catalogues facilitate the proper selection of the proper size according to the amount of water in the system.

CAUTION!

With large-capacity heating circuits, the installed expansion vessel (24 litres, 1.0 bar admission pressure) must be supplemented by an additional vessel.

7.3 Connection on Heat Source Side

The following procedure must be observed when making the connection:

Connect the brine line to the flow and return pipe of the heat pump. The supplied strainer and vent must be field-installed in the brine inlet of the heat pump.

The powerful vent must be installed at the highest point of the heat source system

The hydraulic block schematic must be taken into account when so doing.

The brine liquid must be produced prior to charging the system. The brine concentration must be at least 25 %. Freeze protection down to -14 °C can thus be ensured.

Only antifreeze agents on a monoethylene glycol or propylene glycol basis are to be used.

The heat source system has to be vented and leak-tested.

CAUTION!

The brine solution must contain at least 25 % of an antifreeze and corrosion protection agent on a monoethylene glycol or propylene glycol basis.

7.4 Electrical Connection

The following electrical connections must be established on the heat pump.

- Connection of the load wire to the control panel of the heat pump.
- Connection of the control voltage wire to the control panel of the heat pump.

All electrical components required for the operation of the heat pump are located on the control panel.

For detailed instructions concerning the connection of external components and the operation of the heat pump controller refer to the heat pump terminal diagram and the operating manual of the controller.

Connection of the load wire to the control panel via terminals X1: L1/L2/L3/PE.

An all-pole disconnecting device with a contact gap of at least 3 mm (e.g. utility company disable contactor or power contactor) as well as a 3-pole circuit breaker with simultaneous tripping of all external conductors must be provided. The required cross-sectional area of the conductor is to be selected according to the power consumption of the heat pump, the technical connection requirements of the relevant utility company and all applicable regulations. Power consumption data of the heat pump is provided in the product literature and on the nameplate. The terminals are designed for a max. conductor cross-section of 10 mm².

CAUTION!

The clockwise phase sequence must be observed when connecting the electric load lines (in the case of an incorrect phase sequence the heat pump will deliver no output and generate a lot of noise).

Connection of the control voltage wire is effected via terminals X1: L/N/PE.

If a more powerful brine pump is required than the one integrated, a motor contactor and an appropriate motor protecting switch need to be installed. The contactor must be connected to the terminals of the internal brine pump (controller terminals J12/N03 and X1-N). The power supply of the larger pump must be provided by the mains supply.

8 COMMISSIONING

8.1 General

To ensure proper commissioning it should be carried out by an after-sales service authorised by the manufacturer. Only then can an extended warranty period of 3 years in total be granted (cf. Warranty service).

8.2 Preparatory Steps

Prior to commissioning, the following items need to be checked:

- All connections of the heat pump must have been made as described in Chapter 7.
- The heat source system and the heating circuit must be filled and tested.
- Strainer and vent must be fitted in the brine inlet of the heat pump.
- All valves that could impair the proper water flow must be open in the brine and heating circuits.
- The heat pump controller must be adapted to the heating installation in accordance with the instructions contained in its operating manual.
- Proper condensate drainage must be ensured.
- Drainage of the liquid emerging from the brine and heating water overflow valves must be ensured.

8.3 Commissioning Procedure

The start-up of the heat pump is effected via the heat pump controller.

CAUTION!

Commissioning of the heat pump must be carried out in accordance with the installation and operating manual of the heat pump controller.

The delivery rate of the circulating pump must be adapted to the heating system.

The setting of the overflow valve must be adapted to the requirements of the heating system. An incorrect setting may result in various error symptoms and an increased electric power consumption. To correctly set the overflow valve, the following procedure is recommended:

Close all of the heating circuits that may also be closed during operation (depending on the type of heat pump usage) so that the least favourable operating state - with respect to the water flow rate - is achieved. Normally, these are the heating circuits of the rooms located on the south and west sides of buildings. At least one heating circuit must remain open (e.g. bathroom).

The overflow valve is to be opened to such an extent that based on the current heat source temperature the maximum temperature difference between heating supply and return flow temperature is obtained, as indicated in the table below. The temperature difference should be measured as closely to the heat pump as possible. In mono-energetic systems, the electric heating element is to be deactivated.

Heat source temperature from	to	max. difference between heating supply and return temperature
-5 °C	0 °C	10 K
1 °C	5 °C	11 K
6 °C	9 °C	12 K
10 °C	14 °C	13 K
15 °C	20 °C	14 K
21 °C	25 °C	15 K

Any malfunctions occurring during operation are indicated on the display of the heat pump controller and can be corrected as described in the operating manual of the heat pump controller.

9 CARE/CLEANING

9.1 Care

The heat pump is designed for maintenance-free operation. To prevent operating malfunctions caused by dirt deposits in the heat exchangers, care must be taken that no contamination whatsoever can enter the heat source and heating systems. In the event that operating malfunctions due to contamination occur nevertheless, the system should be cleaned as described below.

9.2 Cleaning of Heating Side

The ingress of oxygen into the heating water circuit may result in the formation of oxidation products (rust). It is therefore important - in particular with respect to the piping of the underfloor heating systems - that the installation is executed in a diffusion-proof manner.

Also residues of lubricating and sealing agents may contaminate the heating water.

In the case of severe contamination leading to a reduction in the performance of the condenser in the heat pump, the system must be cleaned by a heating technician.

According to current knowledge, we recommend cleaning with a 5% phosphoric acid solution or, in the case that cleaning needs to be performed more frequently, with a 5% formic acid solution.

In either case, the cleaning fluid should be at room temperature. It is recommended that the heat exchanger be cleaned in the direction opposite to the normal flow direction.

To prevent acidic cleaning agents from entering the circuit of the heating installation we recommend that the flushing device be fitted directly to the supply and return lines of the condenser. To prevent any damage caused by cleaning agent residues that may be present in the system it is important that the system be thoroughly flushed using appropriate neutralising agents.

The acids must be used with great care, all relevant regulations of the employers' liability insurance associations must be adhered to.

If in doubt, contact the manufacturer of the chemicals!

CAUTION!

Caution - Heating Technicians !

Depending on the filling water quality and quantity, in particular in the case of mixed installations and plastic pipes, mineral deposits (rust sludge, lime) may form, impairing the proper functioning of the heating installation. A reason for this is the water hardness and oxygen dissolved in the filling waters as well as additional oxygen from the air, which may penetrate via valves, fittings and plastic pipes (oxygen diffusion). As a preventive measure it is recommended that a physical water conditioner such as ELYSATOR be used.

9.3 Cleaning of Heat Source Side

CAUTION!

The supplied strainer is to be installed in the heat source inlet of the heat pump in order to protect the evaporator against contamination.

The filter screen of the strainer should be cleaned one day after commissioning, thereafter every week. If no more contamination can be noticed any more, the strainer filter can be removed in order to reduce pressure losses.

10 MALFUNCTIONS/ TROUBLESHOOTING

This heat pump is a quality product and is designed for trouble-free operation. In the event that a malfunction occurs nevertheless, you will be able to correct the problem yourself in most of the cases. Simply consult the Malfunctions and Troubleshooting table contained in the operating manual of the heat pump controller.

Additional malfunctions can be interrogated at the heat pump controller.

If you cannot correct the malfunction yourself, please contact the after-sales service agent in charge (see Warranty Certificate).

CAUTION!

All work on the heat pump may only be performed by an authorised and qualified after-sales service.

11 DECOMMISSIONING

11.1 Shutdown in Summer

Shutting down the heating system in summer is effected by switching the heat pump controller to the "Summer" operating mode.

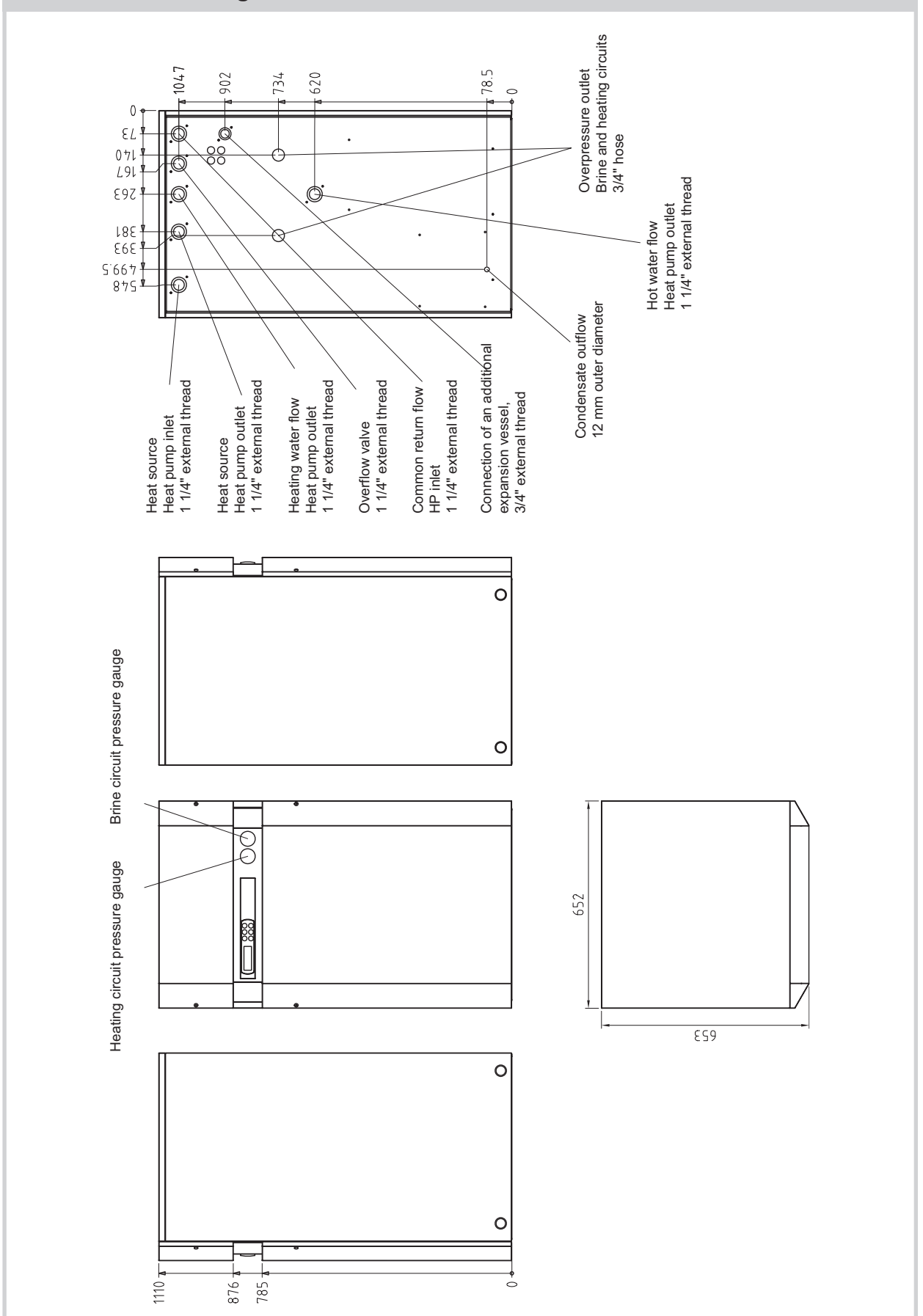
11.2 End-of-Life Decommissioning/ Disposal

Before removing the heat pump, disconnect the machine from the power source and close all valves. Environment-relevant requirements regarding the recovery, recycling and disposal of service fuels and components in accordance with all relevant standards must be adhered to. Particular attention must hereby be paid to the proper disposal of refrigerants and refrigeration oils.

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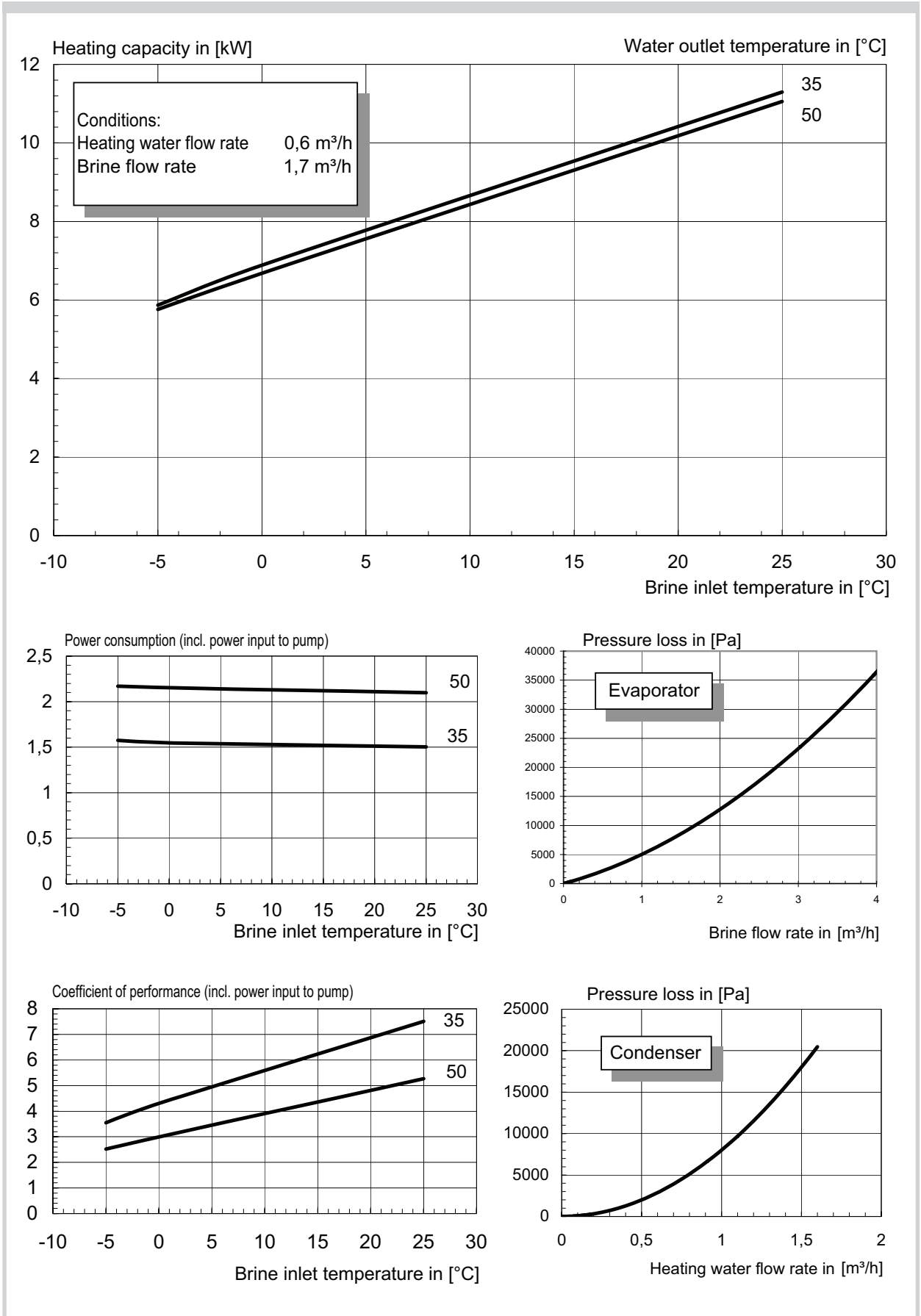
Dimensioned Drawing



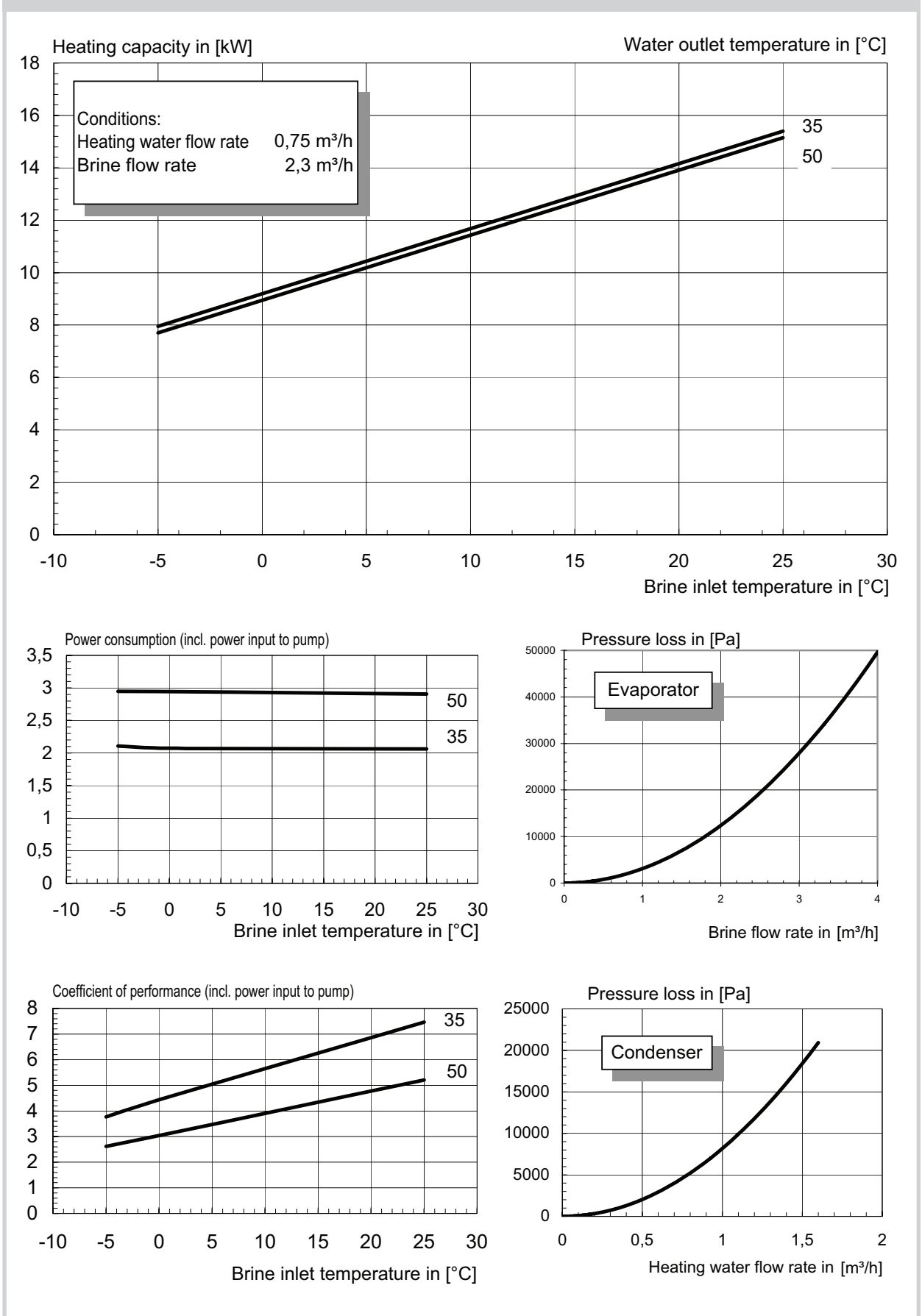
Equipment Data

EQUIPMENT DATA for Brine-to-Water Heat Pumps for Heating						
1	TYPE AND COMMERCIAL DESCRIPTION		..7KS	..9KS	..11KS	..14KS
2	MODEL					
2.1	Type		compact	compact	compact	compact
2.2	Enclosure type acc. to EN 60 529		IP 20	IP 20	IP 20	IP 20
2.3	Installation site		indoors	indoors	indoors	indoors
3	PERFORMANCE DATA					
3.1	Operating temperature limits:					
	Heating water supply	°C	max. 55	max. 55	max. 55	max. 55
	Brine (heat source)	°C	-5 to +25	-5 to +25	-5 to +25	-5 to +25
	Antifreeze agent		monoethylene glycol	monoethylene glycol	monoethylene glycol	monoethylene glycol
	Minimum brine concentration (-13°C freezing temperature)		25%	25%	25%	25%
3.2	Heating water temperature difference at B0 / W35	K	9,9	10,5	10,1	9,6
3.3	Heating capacity / coeff.of perform.					
	at B-5 / W55 1)	kW / ---	5,6 / 2,2	7,7 / 2,3	9,4 / 2,4	12,5 / 2,6
	at B0 / W50 1)	kW / ---	6,7 / 2,9	9,0 / 3,1	11,3 / 3,0	14,2 / 3,4
	at B0 / W35 1)	kW / ---	6,9 / 4,3	9,2 / 4,4	11,8 / 4,4	14,5 / 4,5
3.4	Sound power level	dB(A)	51	51	51	51
3.5	Heating water flow rate at internal pressure difference	m³/h / Pa	0,6 / 2500	0,75 / 4500	1,0 / 3500	1,3 / 3500
3.6	Free pressure, heating circulating pump (stage 3)	Pa	47500	43500	65500	64500
3.7	Brine flow rate at internal pressure difference (heat source)	m³/h / Pa	1,7 / 10000	2,3 / 16000	3,0 / 13000	3,5 / 13000
3.8	Free pressure, brine pump (stage 3)	Pa	55000	44000	40000	34000
3.9	Refrigerant; total charge weight	type / kg	R407C / 1,5	R407C / 1,8	R407C / 2,0	R407C / 2,3
4	DIMENSIONS, CONNECTIONS AND WEIGHT					
4.1	Equipment dimensions without connections 4)	H x W x L mm	1110 x 652 x 653	1110 x 652 x 653	1110 x 652 x 653	1110 x 652 x 653
4.2	Equipment connections for heating system	inches	R 1¼" ext.	R 1¼" ext.	R 1¼" ext.	R 1¼" ext.
4.3	Equipment connections for heat source	inches	R 1¼" ext.	R 1¼" ext.	R 1¼" ext.	R 1¼" ext.
4.4	Weight of transport unit(s) incl. packaging	kg	179	180	191	203
5	ELECTRICAL CONNECTION					
5.1	Nominal voltage; fusing	V / A	400 / 16	400 / 16	400 / 16	400 / 16
5.2	Nominal power consumption 1) B0 W35	kW	1,6	2,07	2,66	3,22
5.3	Starting current with soft starter	A	30 (no soft starter)	15	26	26
5.4	Nominal current B0 W35 / cosφ	A / ---	2,89	3,77	4,84	5,81
6	COMPLIES WITH EUROPEAN SAFETY REGULATIONS		3)	3)	3)	3)
7	OTHER DESIGN CHARACTERISTICS					
7.1	Water inside equipment protected against freezing 2)		yes	yes	yes	yes
7.2	Performance settings		1	1	1	1
7.3	Controller internal / external		internal	internal	internal	internal
1)	These data characterize the size and performance capability of the system. For economic and energetic reasons, additional factors such as balance point and control need to be taken into consideration. Abbreviations have the following meaning, e.g. B10 / W55: heat source temperature 10 °C and heating water supply temperature 55 °C.					
2)	The heating circulating pump and the controller of the heat pump must be ready for operation at all times.					
3)	s. EC Declaration of Conformity					
4)	Please keep in mind that more space is required for pipe connection, operation and maintenanc.					
	Subject to technical modifications		Issued: 23.04.2004			

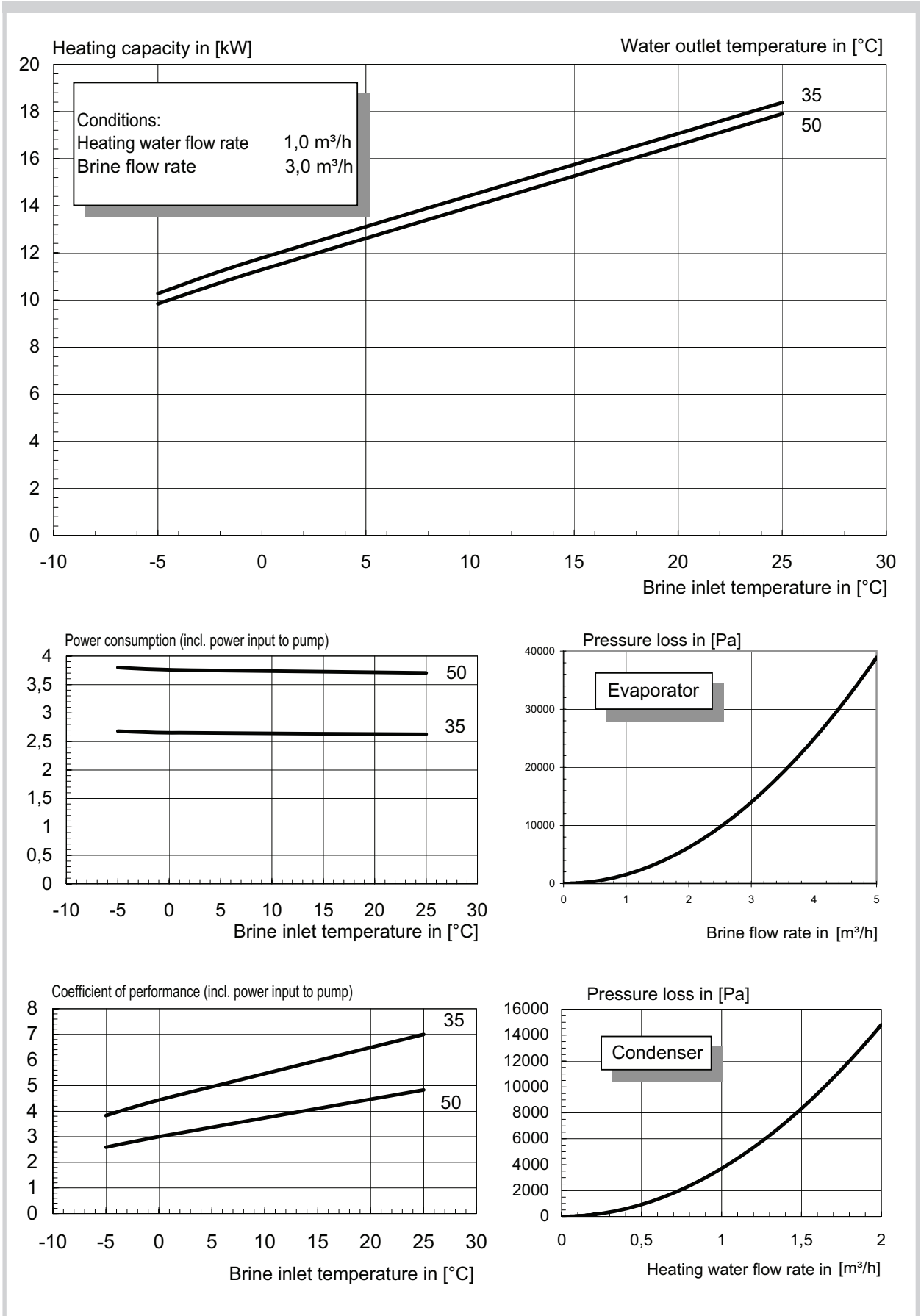
12.3.1 Characteristics .. 7KS



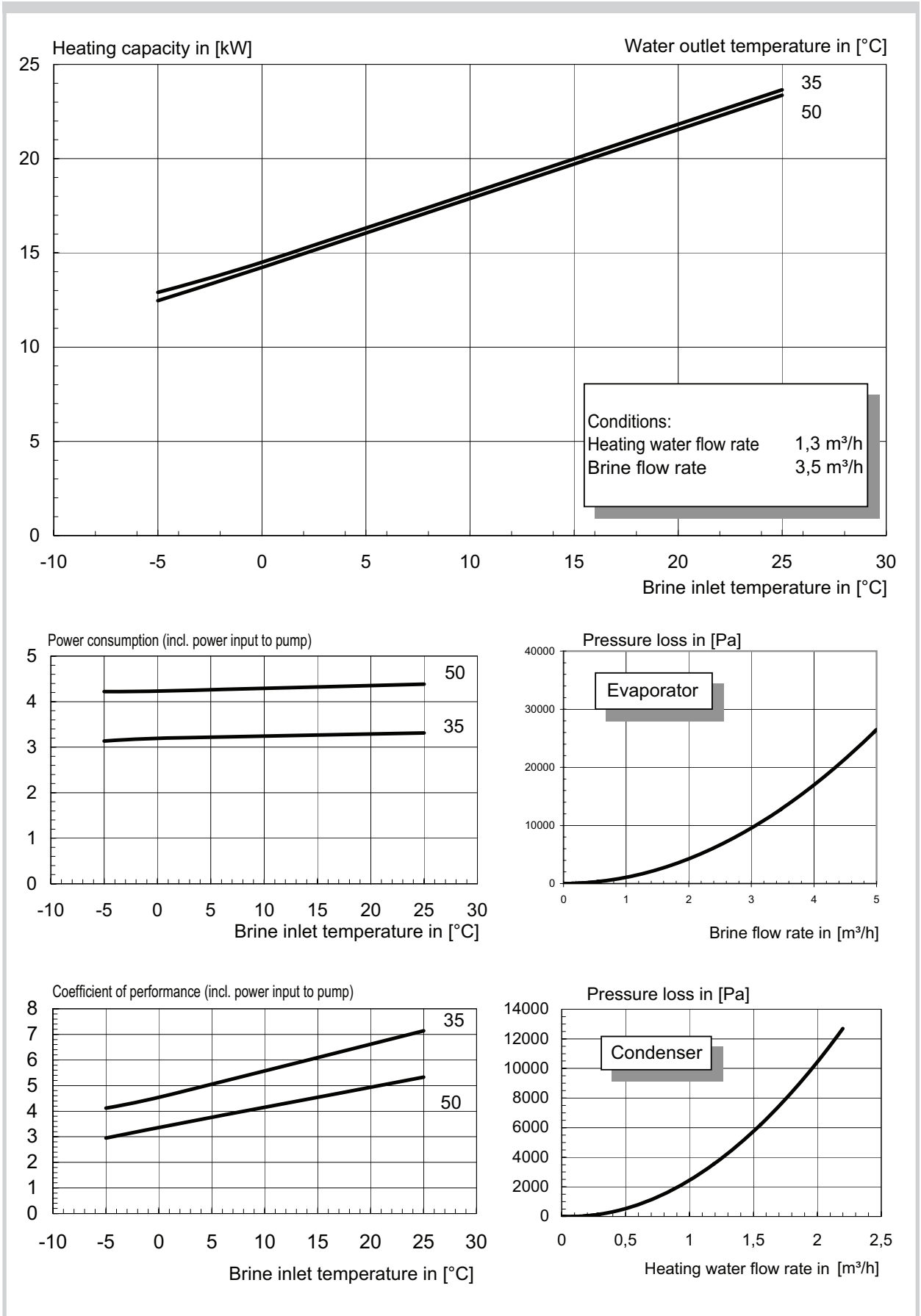
12.3.2 Characteristics .. 9KS



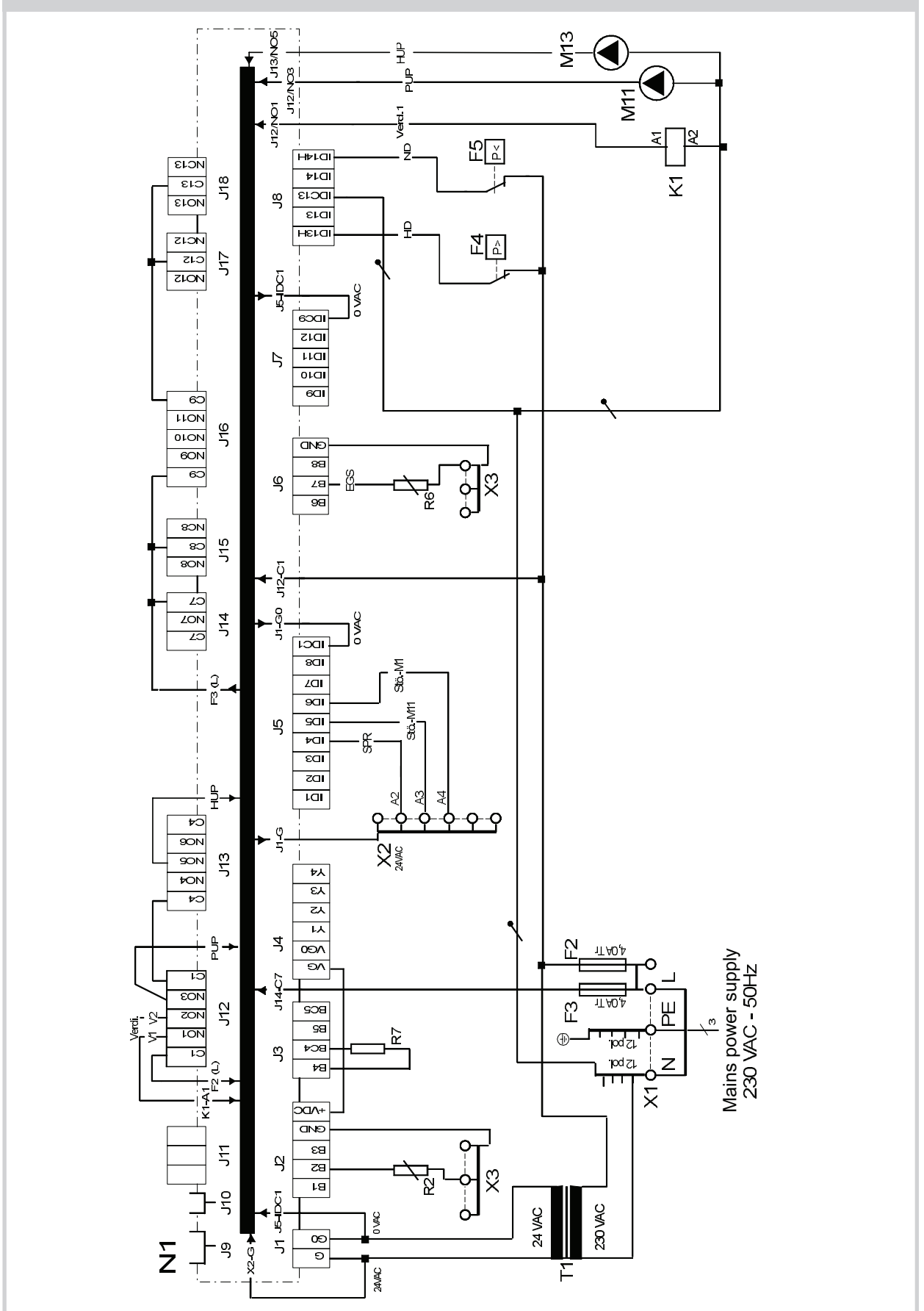
12.3.3 Characteristics .. 11KS



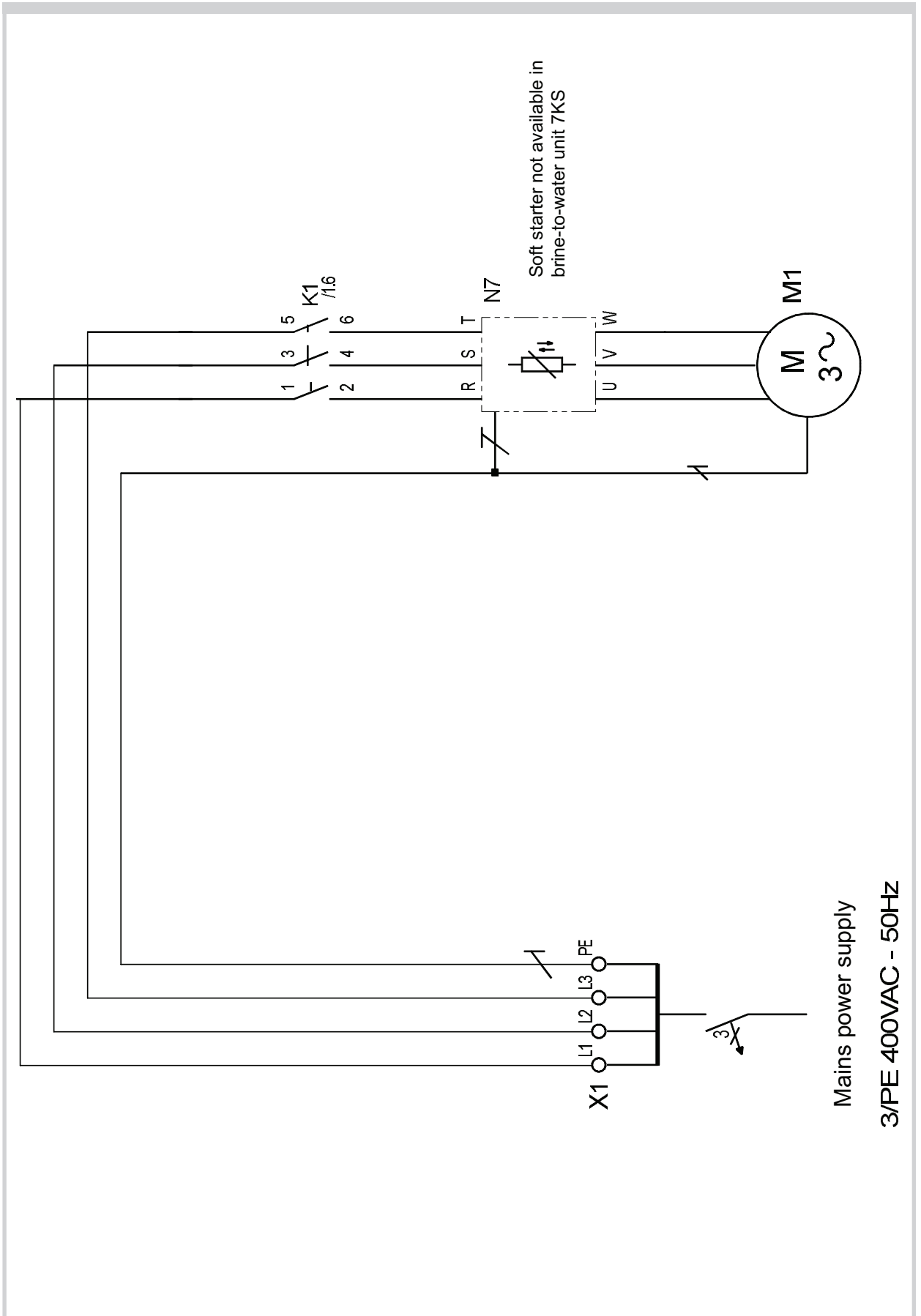
12.3.4 Characteristics .. 14KS



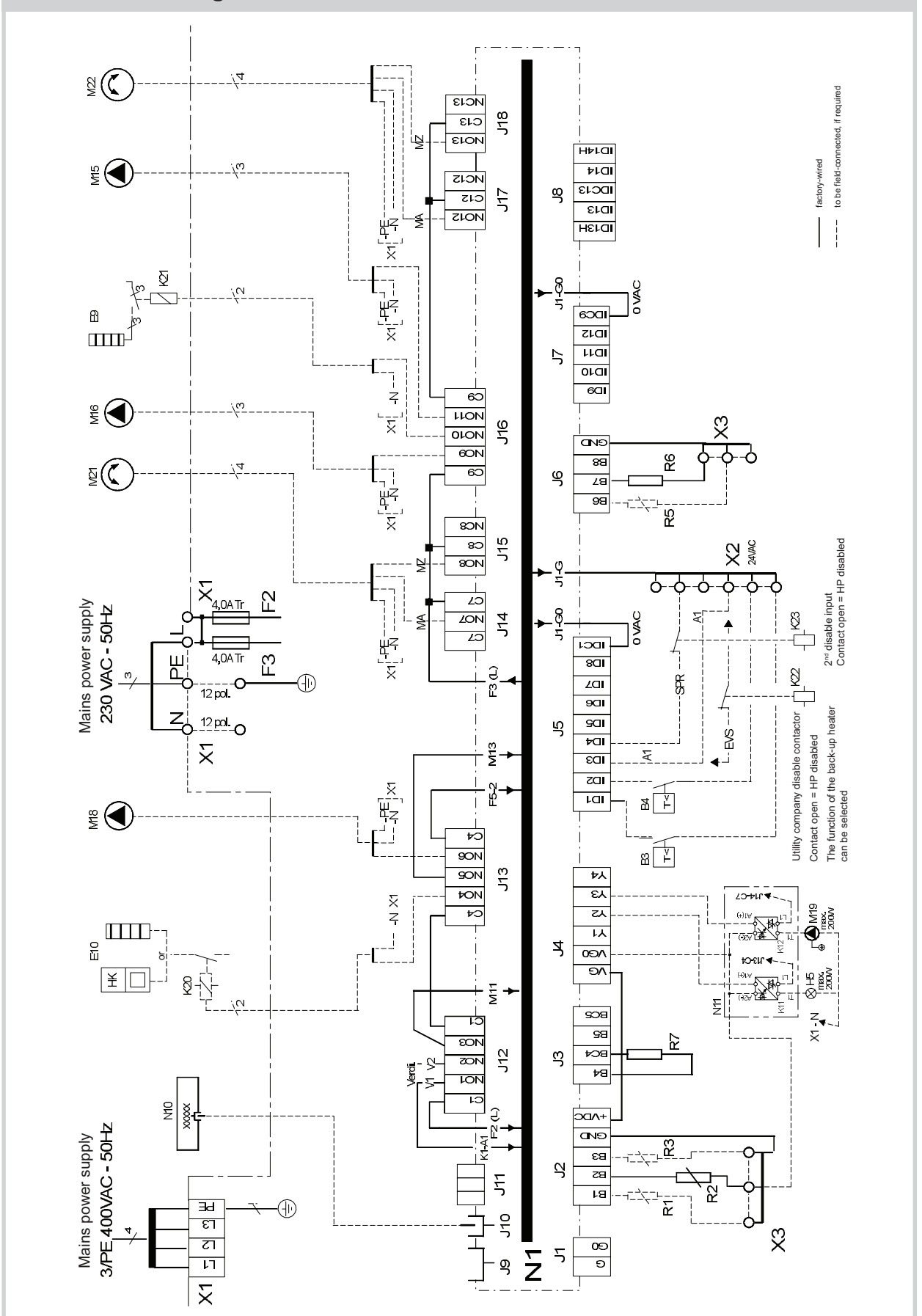
12.4.1 Control .. 7KS to .. 14KS



12.4.2 Load .. 7KS to .. 14KS



12.4.3 Terminal Diagram .. 7KS to .. 14KS



12.4.4 Legend .. 7KS to .. 14KS

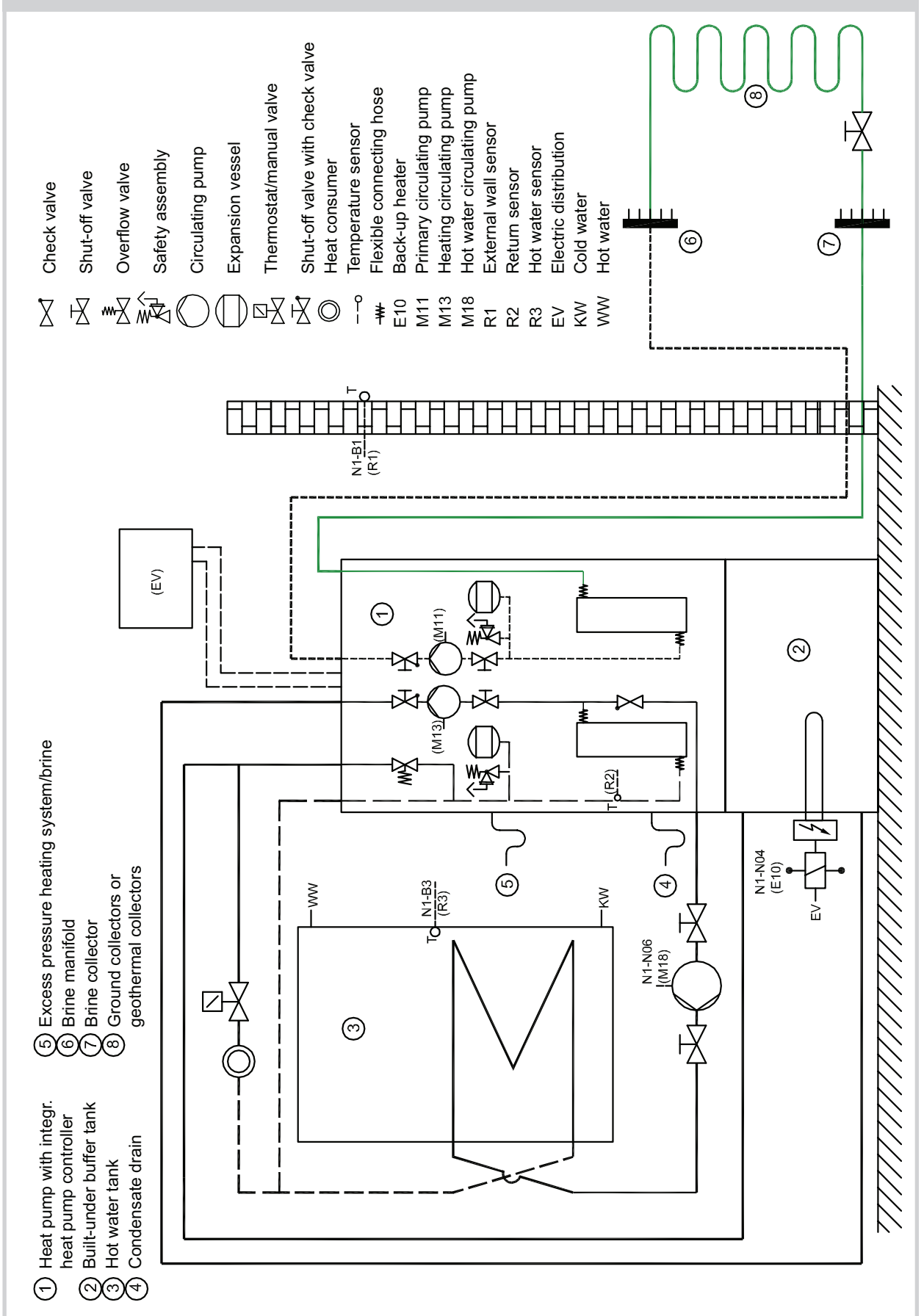
A1	Wire jumper, must be inserted if no utility company disable contactor is required	
A2	Wire jumper, must be removed if 2nd disable input is used	
B3*	Thermostat, hot water	
B4*	Thermostat, swimming pool water	
E9*	Electric immersion heater, hot water	
E10*	Back-up heater (boiler or electric heating element)	
F2	Load fuse for N1 relay outputs across J12 and J13	4,0 ATr
F3	Load fuse for N1 relay outputs across J15 to J18	4,0 ATr
F4	Pressostat, high pressure	
F5	Pressostat, low pressure	
H5*	Lamp, remote fault indicator	
J1...J18	Terminal connectors at N1	
K1	Contactor, compressor	
K11*	Electron. relay for remote fault indicator (on relay module)	
K12*	Electron. relay for swimming pool water circulating pump (on relay module)	
K20*	Contactor, back-up heater	
K21*	Contactor, electr. immersion heater, hot water	
K22*	Utility company disable contactor	
K23*	SPR auxiliary relay	
M1	Compressor	
M11	Primary circulating pump (brine)	
M13	Heating circulating pump	
M15*	Heating circulating pump, heating circuit 2	
M16*	Suppl. circulating pump	
M18*	Hot water circulating pump	
M19*	Swimming pool water circulating pump	
M21*	Mixer, primary circuit	
M22*	Mixer, heating circuit 2	
N1	Heat pump controller	
N7	Soft starter	
N10*	Remote control station	
N11*	Relay module	
R1	External sensor	
R2	Return sensor	
R3	Hot water sensor (as an alternative to the hot water thermostat)	
R5	Sensor for heating circuit 2	
R6	Freeze protection sensor	
R7	Coding resistor 8.2 kOhm	
T1	Safety isolating transformer 230/24 VAC-28VA	
X1	Terminal strip, mains-load 3L/PE-400 VAC-50 Hz/ Mains-control L/N/PE-230 VAC-50Hz / fuses/N- and PE-terminal block	
X2	Terminal strip 24 VAC-terminal block	
X3	Terminal strip GND terminal block for analog inputs at J2 and J6	

Abbreviations:

EVS	Utility company disable input
SPR	Supplementary disable input, configurable
MA*	Mixer OPEN
MZ	Mixer CLOSED

* Components to be supplied by the customer

Hydraulic Block Diagram



EC Declaration of Conformity



Declaration of Conformity



The undersigned

Glen Dimplex Deutschland GmbH
 Division Dimplex
 Am Goldenen Feld 18
 D-95326 Kulmbach

hereby confirm that the design and construction of the product(s) listed below, in the version(s) placed on the market by us, conform to the relevant requirements of the applicable EC directives.

This declaration becomes invalidated if any modifications are made to the product(s) without our prior authorization.

Designation of the product(s):

Brine-to-water heat pumps
 for indoor installation,
 containing R407C

EC Directives:

EC Low Voltage Directive
 (73/23/EEC)
 EC EMC Directive
 (89/336/EEC)
 Pressure Equipment Directive
 (97/23/EEC)

Type(s):

Harmonized EN Standards:

SI 7KS	EN 255:1997	
SI 9KS	EN 378:1994	
SI 11KS	DIN EN 60335-1 (VDE 0700 Teil1):1995-10	EN 60335-1:1994+A11:1995
SI 14KS	DIN EN 60335-1/A1 (VDE 0700 Teil1/A1):1997-08	EN 60335-1/A1:1996
	DIN EN 60335-1/A12 (VDE 0700 Teil 1/A12):1997-08	EN 60335-1/A12:1996
	DIN EN 60335-1/A13 (VDE 0700 Teil 1/A13):1998-12	EN 60335-1/A13:1998
	DIN EN 60335-1/A14 (VDE 0700 Teil 1/A14):1999-05	EN 60335-1/A14:1998
	DIN EN 60335-2-40 (VDE 0700 Teil 40):1998-07	EN 60335-2-40:1997
	DIN EN 55014-2 (VDE 0875 Teil 14-2):1997-10	EN 55014-2:1997
	Requirements of category II	
	DIN EN 55014-1 (VDE 0875 Teil 14-1):1999-10	EN 55014-1:1993+A1:1997+A2:1999
	DIN EN 61000-3-2 (VDE 0838 Teil 2):1998-10	EN 61000-3-2:1995+
		Corrigendum:1997+A1:1998+A2:1998
	DIN EN 61000-3-2/A14 (VDE 0838 Teil 2/A14):2001-01	EN 61000-3-2:1995/A14:2000
	DIN EN 61000-3-3 (VDE 0838 Teil 3):1996-03	EN 61000-3-3:1995

Order No.:

341 860
 341 870
 341 880
 341 890

National Standard/Directives:

<u>D</u>	<u>A</u>	<u>CH</u>
VBG20		SVTI

Wolfgang Weinhold
 General Manager

Mathias Huprich
 Technical Director

Kulmbach, 25.04.2005

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